

Amendments to the Claims

This listing of claims will replace all prior listings of claims in the application.

Listing of Claims

1. (Currently amended) A cutting tool having a tool shank ~~(10)~~ and a cutting head ~~(12)~~ made of different materials which are integrally connected to one another via a joining layer ~~(18')~~ made of ductile brazing material at joining surfaces ~~(14, 16)~~ facing one another, powder particles ~~(31)~~ made of a temperature-resistant material having a lower coefficient of thermal expansion than the brazing material ~~(30)~~ being embedded in the joining layer ~~(18')~~, ~~characterized in that~~ wherein the joining layer ~~(18')~~ has a different coefficient of thermal expansion over its layer thickness, the coefficient of thermal expansion being lower on the side ~~(32)~~ of the cutting head ~~(12)~~ than on the side ~~(34)~~ of the tool shank ~~(10)~~.

2. (Currently amended) The cutting tool as claimed in claim 1, ~~characterized in that~~ wherein the density of the powder particles ~~(31)~~ varies over the thickness of the joining layer ~~(18')~~.

3. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~ wherein the density of the powder particles ~~(31)~~ within the joining layer ~~(18')~~ is higher on the side ~~(32)~~ of the cutting head ~~(12)~~ than on the side ~~(34)~~ of the tool shank ~~(10)~~.

4. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~ wherein the tool shank ~~(10)~~ ~~is made of~~ comprises steel, ~~preferably of tool steel~~.

5. (Currently amended) The cutting tool as claimed in claim 4, ~~characterized in that~~wherein the tool shank is made of a case-hardened steel having a phase transformation point within a range of 480°C to 650°C.

6. (Currently amended) The cutting tool as claimed in claim 5, ~~characterized in that the tool shank is made of~~wherein the case-hardened steel ~~having~~has a chrome content of less than 2%.

7. (Currently Amended) The cutting tool as claimed in claim 5, ~~characterized in that the tool shank is made of~~wherein the case-hardened steel is a 16MnCr5 steel.

8. (Currently Amended) The cutting tool as claimed in ~~Claim~~claim 5, ~~characterized in that~~wherein the case-hardened steel is carburized or nitrided at least on the outer surface of the tool shank.

9. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the cutting head is made of a material ~~offrom~~from the group ~~comprising~~consisting of cemented carbide, cermet, ceramic or PCD.

10. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the joining surfaces ~~(14, 16)~~, facing one another, of the tool shank ~~(10)~~ and the cutting head ~~(12)~~ are preferably curved so as to be complementary to one another.

11. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the joining surface ~~(14)~~ of the cutting head ~~(12)~~ is convexly curved.

12. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the joining surface ~~(14)~~ of the tool shank ~~(10)~~ is concavely curved.

13. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the tool shank ~~(10)~~ has at least one ~~preferably~~ helically wound flute ~~(26)~~, which passes through the joining layer ~~(18')~~ in the direction of the cutting head ~~(12)~~.

14. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the tool shank ~~(10)~~ has at least one ~~preferably~~ helically wound functional passage ~~(28)~~, which passes through the joining layer ~~(18')~~ in the direction of the cutting head ~~(12)~~.

15. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the joining layer ~~(18')~~ contains a brazing material ~~effrom~~ the group comprising copper, silver, cobalt or their alloys.

16. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the powder particles ~~(31)~~ embedded in the brazing material ~~(30)~~ of the joining layer ~~(18')~~ are made of a material ~~effrom~~ the group comprising tungsten, molybdenum, iron, cobalt, nickel or their carbides.

17. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the thickness of the joining layer ~~(18')~~ corresponds to 10 to 1000 times the diameter of the powder particles ~~(31)~~.

18. (Currently Amended) The cutting tool as claimed in claim 1, ~~characterized in that~~wherein the thickness of the joining layer ~~(18')~~ is from 0.1 mm to 2 mm.

19-35. (Cancelled)

36. (New) A cutting tool comprising:

a tool shank made of a first material;

a cutting head made of a second material having a different coefficient of thermal expansion than the first material; and

a brazing disk having a thickness between opposing first and second joining faces, said brazing disk having said first joining face brazed to said tool shank and said second joining face brazed to said cutting head to form said cutting tool, said brazing disk comprising:

ductile brazing material; and

powder particles embedded in the ductile brazing material, said powder particles made of a temperature-resistant material having a lower coefficient of thermal expansion than the brazing material, the density of the powder particles varying over the thickness of said brazing disk so that the density of said powder particles is greater at one of said first and second joining faces than the density at the other of said first and second joining faces,

wherein, due to the varying density of the powder particles, said brazing disk has a different coefficient of thermal expansion over its layer thickness and the coefficient of thermal expansion is different at the second joining face brazed to the cutting head than at the first joining face brazed to the tool shank.

37. (New) The cutting tool as claimed in claim 36, wherein the joining faces are shaped to interconnect with said tool shank and said cutting head in an exact alignment.

38. (New) The cutting tool as claimed in claim 37, wherein a joining surface of said cutting head is convexly curved and the second joining face is concavely curved.

39. (New) The cutting tool as claimed in claim 36, wherein the tool shank has at least one helically wound functional passage that passes through the brazing disk in the direction of the cutting head.

40. (New) The cutting tool as claimed in claim 36, wherein the thickness of the brazing disk is from 0.1 mm to 2 mm.

41. (New) The cutting tool as claimed in claim 36, wherein the density of the powder particles in the brazing disk is varied so that the coefficient of thermal expansion at the first joining face is essentially the same as the coefficient of thermal expansion of said tool shank to form an essentially stress-free joint and the coefficient of thermal expansion at the second joining face is essentially the same as the coefficient of thermal expansion of said cutting head to form an essentially stress-free joint.

42. (New) The cutting tool as claimed in claim 36, wherein the at least one brazing disk comprises first and second brazing disks.

43. (New) The cutting tool as claimed in claim 36, wherein the brazing material contains copper, silver, cobalt or their alloys.

44. (New) The cutting tool as claimed in claim 43, wherein the powder particles embedded in the brazing material are made of a material from the group comprising tungsten, molybdenum, iron, cobalt, nickel or their carbides.

45. (New) The cutting tool as claimed in claim 1, wherein the joining layer comprises a brazing disk.

46. (New) The cutting tool as claimed in claim 45, wherein the density of the powder particles varies over the disk radius.

47. (New) The cutting tool as claimed in claim 45, wherein the brazing disk includes holes, recesses or grooves.